SPECIAL STUDIES

Cancer Rates Among Rhode Island Hispanics

Introduction

The 2000 US Census enumerated more than 85,000 persons in Rhode Island who self-identified as Hispanic, representing about 8.5% of the state's total population and comprising the state's largest racial or ethnic minority group. Producing regular health statistics for Hispanics is challenging because ethnicity is difficult to measure in health surveillance systems of even the best design. Here we have evaluated the ability of two major surveillance systems, the Rhode Island Cancer Registry and the Vital Records death certificate file, to measure cancer morbidity and mortality among resident Hispanics.

Methods

Because Census Bureau inter-censal estimates of the number of resident Rhode Island Hispanics were inconsistent with counts from the 2000 US Census, new inter-censal estimates were constructed for resident Rhode Island Hispanics by year, sex, and age group for the years 1989-1998, using linear interpolation and extrapolation from 1990 and 2000 Census counts.

Data on resident cancer cases and deaths identified as Hispanic were extracted from Cancer Registry case reports and from Vital Records death certificates for the ten years 1989-1998 and aggregated by age group, sex, and year of event.

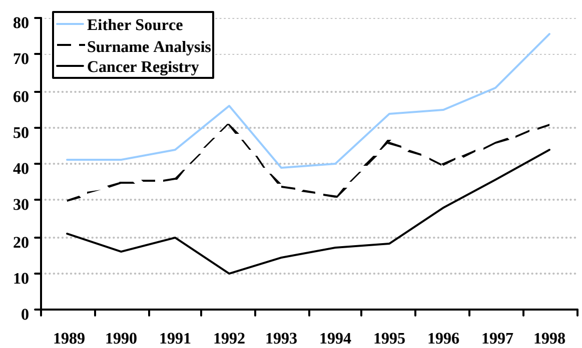
Alternative counts of cases and deaths for resident Rhode Island Hispanics were estimated using a validated US Census technique for identifying Hispanics by surname. (Word)For resident males, data on surname from cancer case reports and from death certificates with cancer as the cause of death for the years 1989-1998 were searched for any of "639 most frequently occurring heavily Hispanic surnames" identified by the Bureau of the Census. ("Heavily Hispanic" means that 75% or more of the people with a particular surname self-identified as Hispanic on the survey.) For resident females, data on father's surname from death certificates with cancer as the cause of death for the years 1989-1998 were searched for any of the 639 names. (Data on father's surname are not available on Rhode Island Cancer Registry case reports.)

Synthetic aggregates of Hispanic cancer cases and cancer deaths were created by adding the additional cases and deaths classified as Hispanic on the basis of the surname analysis to those deaths identified as Hispanic in case reports and on death certificates. These estimates were combined with the estimates of the Hispanic population of Rhode Island for 1989-1998 to construct age-adjusted cancer incidence rates (males only) and age-adjusted cancer mortality rates (males and females). The year 2000 standard US population was used for age-adjustment.

The synthetic aggregates of Hispanic cancer cases were also used to examine the proportion of cancer cases by anatomic site, comparing them with similar data for the Rhode Island population as a whole.

Figure 14-1. Hispanic male cancer cases by data source and year

Annual number of newly diagnosed cancers by data source and year among resident Hispanic males, RI, 1989-1998.

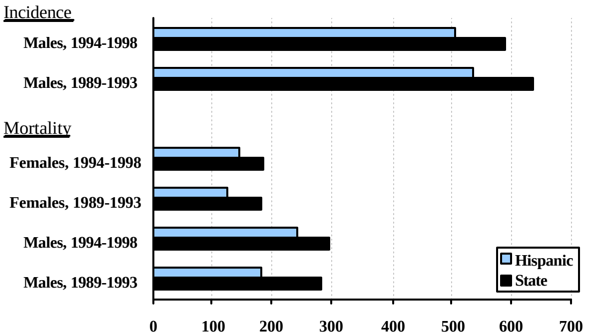


Source: RICR, HEALTH; surname analysis technique from Word.

Over the ten-year period examined, a total of 507 diagnosed cases of cancer were identified among Hispanic males, identified either from case reports or from the surname analysis. Of these, 224 (44.2%) were identified from case reports, and an additional 283 (55.8%) were identified only by Hispanic surname. By year, aggregation of cases from the two methods more than doubled the number of cases originally reported to the Cancer Registry as Hispanic in the first eight years of observation, and enhanced case counts substantially in 1997 and 1998 as well. The number of cancer deaths among Hispanic males and females during this period showed similar enhancements from the surname analysis.

Figure 14-2. Hispanic and all resident cancer rates by year and sex

Average annual cancer rates for all cancers combined by year and sex among Hispanics and all residents, RI, 1989-1998.*

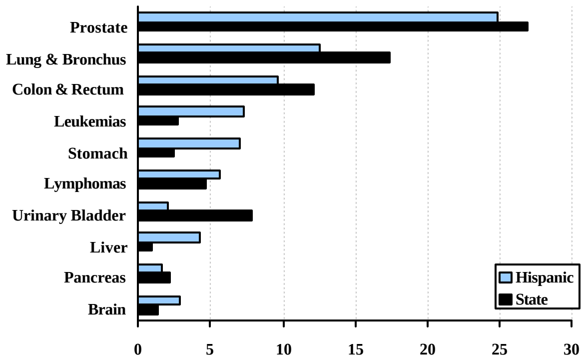


* Rates are age-adjusted to the year 2000 US standard population, expressed as cases/deaths per 100,000 population.
Data source: RICR, HEALTH; Office of Vital Records, HEALTH; surname analysis technique from Word.

The figure at left presents age-adjusted cancer incidence and mortality rates for resident RI Hispanic males and age-adjusted cancer mortality rates for resident RI Hispanic females in 1989-1993 and in 1994-1998, along with comparable rates for the state as a whole. In all comparisons, Hispanics have age-adjusted cancer rates that fall near but below age-adjusted cancer rates for the state as a whole.

Figure 14-3. Male Hispanic and all resident cancer cases by site

Average annual percentage of all newly diagnosed cancers by anatomic site among Hispanics males versus all resident males, RI, 1994-1998.



Data source: RICR, HEALTH; surname analysis technique from Word.

The three most frequently occurring cancers by anatomical site during 1994-1998 were the same for Hispanic males in RI as for all males: Prostate; lung and bronchus; and colon and rectum. Among other major cancer sites, resident Hispanic males were more likely than resident males overall to develop cancers of the stomach and liver and leukemias, and less likely than resident males overall to develop cancer of lung and bronchus and of the urinary bladder. Patterns for the period 1989-1993 were similar.

Discussion

This analysis of data on cancer incidence and mortality among Hispanic Rhode Island residents supports conclusions concerning both patterns of disease and the reliability of the underlying data.

- The use of an authoritative list of Hispanic surnames to augment Hispanic origin information on cancer registry case reports and death certificates approximately doubles the number of cancer cases that are presumably Hispanic in each of the two databases. Thus, these reporting systems are substantially understating the extent of cancer in this population.
- Based on the rates produced from the synthetic aggregates, Hispanic cancer rates are generally similar to statewide cancer rates for all sites.
- The site distribution for cancer incidence among male Hispanics follows the statewide distribution with two divergences worth noting. The observed higher proportions of stomach and liver cancers may be linked to the dietary patterns and infectious disease patterns (e.g., Hepatitis B) in developing countries and in immigrants from those countries. The high proportion of leukemias is consistent with a population whose age distribution is heavily weighted towards the very young.

Healthy People 2010 set a national goal of eliminating health disparities, in particular among disadvantaged racial and ethnic populations. (HP)To support the accomplishment of this sweeping goal, public health surveillance data must have accurate and consistent reporting of race and ethnicity. The Rhode Island Department of Health has recently revised its policy on the collection of data on race and ethnicity and intends to improve the quality of the collected data as the changes in policy are implemented. (Buechner)The findings of this analysis show the clear need for such quality improvement efforts.

Cancer Mortality in Rhode Island, an Old Urban State

Previous analyses (Fulton1, Fulton2) established that Rhode Island (RI) cancer mortality, among the highest in the United States (US), displays an "urban profile." (Greenberg) In brief, RI, one of the most urban states, has experienced higher rates of cancer mortality than the nation over a period of at least five decades. When this differential is decomposed, it is found to be caused by cancers of a limited number of anatomical sites, including cancers in which diet is implicated and cancers related to tobacco use. Mortality rates from these cancers are elevated in urban areas throughout the developed world. (Greenberg)

The Rhode Island Department of Health extended earlier analyses with the addition of data on cancer mortality during 1990-1999 for both RI and the US. Findings relating to trends over the period 1970-1999 and relating to differences between RI and US rates are discussed.

Methods

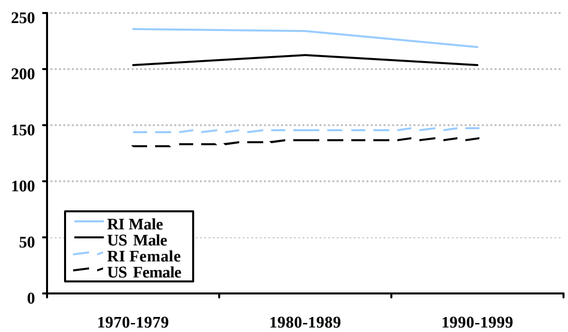
RI and US cancer mortality rates for 1970-1999 were obtained from the National Cancer Institute's SEER Incidence and US Mortality Statistics. (SEER Incidence, SEER Mortality) All rates, published and derived, are directly standardized for age, using the 1970 population of the US as the standard population, and are expressed as "average annual deaths per 100,000 population per year." They are specific for race and gender, and are grouped by decade.

The percent elevation (RI rate relative to US rate) of mortality caused by tobacco-related cancers was determined using cancers of the lung-bronchus, urinary bladder, esophagus, oral cavity, pharynx, and larynx. The sites used to determine percent elevation for cancers in which diet is implicated include cancers of the colon-rectum, stomach, breast among females, and prostate among males.

All results are based on cancer deaths among whites only. RI and US African-American cancer mortality rates were not available for the years 1970-1979 (race-specific rates only identified white and non-white). Also, RI rates for all races other than white and for Hispanics are based on small numbers of deaths, which are associated with large standard errors.

Figure 14-4. Cancer mortality for all cancers combined by sex and decade

Cancer mortality rates for all cancers combined by sex and decade, RI and US, 1970-1999.*



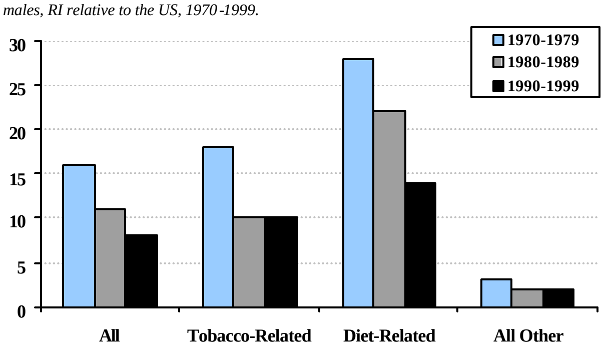
* Rates are age-adjusted to the year 1970 US standard population, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Among white males in RI, trends in mortality from all cancers combined decreased from the 1970s to the 1980s, the first decrease since at least the 1950s, and continued to decline into the 1990s. Among white males in the US, all-cancer mortality rates increased from the 1970s to the 1980s, and in the 1990s, also exhibited a decrease for the first time since at least the 1950s. RI rates were higher than US rates in each of the decades observed. Overall, from the 1970s to the 1990s, RI all-cancer mortality rates decreased by 6.7% and US rates decreased by less than 1%. The decline in cancer death rates was driven by decreases among diet-related cancers (down 21.2% in RI and 12.0% in the US) and, in RI, among tobacco-related cancers (down 5.0%). For the US, tobacco-related cancer deaths were 1.8% higher in the 1990s than the 1970s, and 5.1% lower than in the 1980s.

All-cancer mortality rates for white females were higher in RI than in the US during each decade from 1970 through 1999. In both geographical areas, rates increased from the 1970s through the 1990s. With an overall increase of 5.3%, the increase in US white female cancer mortality rates was more substantial than the 2.4% increase in RI rates. Decreases in diet-related cancers (down 26.6% in RI and 19.3% in the US) were largely offset by increases in tobacco related cancers (up 98.6% in RI and 88.4% in the US).

Figure 14-5. Percent elevation in white male cancer mortality by cancer site group and decade

Percent elevation in cancer mortality rates by cancer site group and decade among white males, RI relative to the US, 1970-1999.*

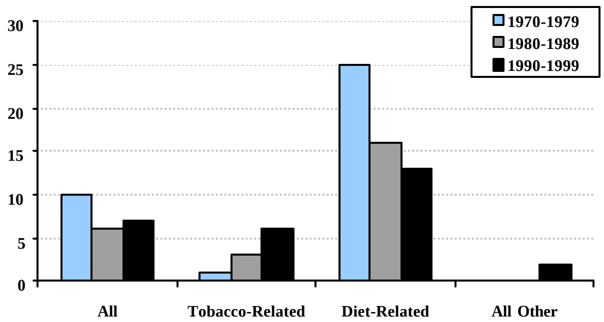


* Rates are age-adjusted to the year 1970 US standard population, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Among white males, the percent elevation of RI mortality rates relative to US rates for all-cancer mortality decreased from the 1970s through the 1990s. This decline was driven by decreases in the RI elevation of tobacco-related cancer mortality (down from 18% in the 1970s to 10% in the 1990s) and diet-related cancer mortality (down from 28% to 14%). Mortality from all other cancers was elevated only slightly in the 1970s, 1980s, and 1990s. Despite the decreasing trend in the percent elevation, RI tobacco- and diet-related cancer death rates remain higher than those of the US.

Figure 14-6. Percent elevation in white female cancer mortality by cancer site group and decade

Percent elevation in cancer mortality rates by cancer site group and decade among white females, RI relative to the US, 1970-1999.*



* Rates are age-adjusted to the year 1970 US standard population, expressed as deaths per 100,000 population.
Source: SEER US Mortality 1969-2000 Data; SEER web query system.

Among RI white females, the percent elevation over the US in all-cancer mortality decreased from the 1970s to the 1980s, and changed little from the 1980s to the 1990s. This decline was driven by a reduced elevation of diet-related cancers (down from 25% in the 1970s to 13% in the 1990s) and partly offset by a less substantial but growing elevation in tobacco-related cancers (up from 1% in 1970s to 6% in the 1990s). Mortality from all other cancers was elevated only slightly in the 1970s, 1980s, and 1990s. Despite the decreasing trend in elevated diet-related cancer deaths, RI rates are still higher than those of the US. Also, the RI elevation versus the US for tobacco-related cancer deaths among white females has increased over the three decades examined.

Discussion

During the 1990s, Rhode Island continued to exhibit an “urban profile” in the cancer mortality rates among its white residents. However, for both males and females, the level of elevation in mortality relative to the US was lower than in previous decades. The decline in the level of elevation was greatest for cancer sites related to diet for both males and females and for cancer sites related to tobacco for males.

In addition, for the first time since mid-century, the age-adjusted all-cancer mortality rate for white males fell from one decade to the next in the 1980s in RI and in the 1990s in the US. Mortality from tobacco-related cancers also fell during the 1990s among males. Among both males and females, mortality from diet-related cancers fell during the 1990s in both RI and the US.

The improvements in cancer mortality, especially those related to diet and tobacco, likely reflect changes in risk behaviors in the underlying populations that were accomplished decades earlier. In the case of Rhode Island, the achievement of lower absolute mortality rates, as well as lower rates relative to the national experience, strongly suggests that the state’s residents have adopted healthier lifestyles that will continue to reduce the state’s historically high burden of mortality and morbidity from cancer.

Cancer Incidence in Rhode Island Cities and Towns

Since the recording of its first cancer case reports in October 1986 the Rhode Island Cancer Registry (RICR) of the Rhode Island Department of Health has been asked by various sources to produce cancer incidence rates for municipalities. Doing so requires at least ten years of cancer case reports and appropriate population data from censuses of the state's population. With the recent release of detailed demographic information for municipalities from the United States Census of 2000, it has become possible for the first time to produce cancer incidence rates for the 39 cities and towns of Rhode Island.

<u>Methods</u>

Counts of malignant neoplasms diagnosed between January 1, 1987, and December 31, 2000, categorized by age, sex, anatomical site, and municipality were prepared from cancer case reports made to the RICR. Municipality of residence at diagnosis was ascertained from three separate data fields: municipality, census tract, and zip code. Of 76,331 cases of malignant neoplasms diagnosed between January 1, 1987, and December 31, 2000, municipality of residence at diagnosis could be ascertained unambiguously in 97 percent. Another 0.2 percent included place names and corresponding zip codes that overlap more than one municipality. In these cases, the municipality identified as "primary" for the zip code by the United States Postal Service was selected for use, or absent this information, the largest municipality associated with the place. The remaining cases (slightly less than three percent) contained no useful information on municipality of residence at diagnosis. To avoid underestimating incidence rates, these cases were randomly assigned to municipalities in proportion to the populations of the municipalities in the United States Census of 2000.

Counts of the Rhode Island population by age, sex, and municipality were obtained from publications of the 1990 and 2000 United States Censuses of Population. (CINA) Analogous counts were estimated for the years 1991-1999 by linear interpolation, and for the years 1987-1989 by linear projection, using data from the two censuses.

Age-adjusted sex-specific statewide and municipal cancer incidence rates were calculated from cancer case reports, actual and estimated counts of the Rhode Island population, and the Year 2000 United States Standard Population. (Census) Rates were calculated for all cancers combined and for the four most common malignancies, cancers of the colon-rectum ("colon"), lung-bronchus ("lung"), prostate (males only), and breast (females only).

Table 14 -6. Statewide and municipal cancer mortality rates

Average annual sex-specific statewide and municipal cancer mortality rates, RI, 1987-2000.*

	------------- Males -------------				------------- Females -------------			
Municipality	Colon	Lung	Prostate	All**	Colon	Lung	Breast	All**
State	33.5	89.7	35.2	284.3	21.6	40.8	33.6	181.4
Cumberland	29.8	72.7	36.3	236.7	21.0	30.5	32.5	157.8
East Greenwich	24.2	55.6	24.6	197.3	17.1	24.5	29.7	137.3
East Providence	29.7	72.9	27.2	233.6	17.6	33.6	27.9	152.3
Exeter	10.9	79.1	30.7	189.3	8.7	48.7	24.8	148.7
Foster	17.1	63.7	27.9	147.8	6.9	45.2	20.9	124.4
Glocester	23.1	59.6	29.1	181.1	8.4	25.8	31.6	145.0
Hopkinton	27.0	61.6	17.1	181.0	15.1	26.3	12.9	110.1
Jamestown	19.3	33.4	37.2	189.3	23.3	27.4	35.9	155.7
Johnston	23.1	72.3	27.5	215.4	12.5	32.6	25.8	139.0

Table 14-7. Statewide and municipal cancer incidence rates by site and sex

Please refer to **Appendix: Supplemental Tables** (section 17) for data.

The statewide age-adjusted cancer incidence rate for all cancers combined is 601.4 per 100,000 among males and 435.7 per 100,000 among females. (Table 1) By municipality, rates among males vary from 449.0 for Exeter to 726.1 for East Greenwich, with a standard deviation of 59.2 over the 39 cities and towns. (Table 1) Municipal cancer incidence rates for all cancers combined among females vary from 331.8 for Richmond to 512.4 for Hopkinton, with a standard deviation of 39.8 over the 39 cities and towns.

Table 14 -6. Statewide and municipal cancer mortality rates

Average annual sex-specific statewide and municipal cancer mortality rates, RI, 1987-2000.*

	------------- Males -------------				------------- Females -------------			
Municipality	Colon	Lung	Prostate	All**	Colon	Lung	Breast	All**
State	33.5	89.7	35.2	284.3	21.6	40.8	33.6	181.4
Cumberland	29.8	72.7	36.3	236.7	21.0	30.5	32.5	157.8
East Greenwich	24.2	55.6	24.6	197.3	17.1	24.5	29.7	137.3
East Providence	29.7	72.9	27.2	233.6	17.6	33.6	27.9	152.3
Exeter	10.9	79.1	30.7	189.3	8.7	48.7	24.8	148.7
Foster	17.1	63.7	27.9	147.8	6.9	45.2	20.9	124.4
Glocester	23.1	59.6	29.1	181.1	8.4	25.8	31.6	145.0
Hopkinton	27.0	61.6	17.1	181.0	15.1	26.3	12.9	110.1
Jamestown	19.3	33.4	37.2	189.3	23.3	27.4	35.9	155.7
Johnston	23.1	72.3	27.5	215.4	12.5	32.6	25.8	139.0

Table 14-8. Statewide cancer incidence rates and standard deviations of municipal rates by site and sex

Please refer to **Appendix: Supplemental Tables** (section 17) for data.

Measured relative to statewide incidence rates, the standard deviations of the municipal rates for all cancers combined were 9.8% for males and 9.1% for females. (Table 2) Municipal cancer incidence rates for the four most common site-specific cancers vary more widely over 39 cities and towns. Their standard deviations range from 15.8% to 22.6% of the corresponding statewide rates.

Table 14 -6. Statewide and municipal cancer mortality rates

Average annual sex-specific statewide and municipal cancer mortality rates, RI, 1987-2000.*

	------------- Males -------------				------------ Females ------------			
Municipality	Colon	Lung	Prostate	All**	Colon	Lung	Breast	All**
State	33.5	89.7	35.2	284.3	21.6	40.8	33.6	181.4
Cumberland	29.8	72.7	36.3	236.7	21.0	30.5	32.5	157.8
East Greenwich	24.2	55.6	24.6	197.3	17.1	24.5	29.7	137.3
East Providence	29.7	72.9	27.2	233.6	17.6	33.6	27.9	152.3
Exeter	10.9	79.1	30.7	189.3	8.7	48.7	24.8	148.7
Foster	17.1	63.7	27.9	147.8	6.9	45.2	20.9	124.4
Glocester	23.1	59.6	29.1	181.1	8.4	25.8	31.6	145.0
Hopkinton	27.0	61.6	17.1	181.0	15.1	26.3	12.9	110.1
Jamestown	19.3	33.4	37.2	189.3	23.3	27.4	35.9	155.7
Johnston	23.1	72.3	27.5	215.4	12.5	32.6	25.8	139.0

Table 14-9. Statewide and municipal cancer cases by site and sex

Please refer to **Appendix: Supplemental Tables** (section 17) for data.

A caution that should be observed in comparing rates across geographic entities with small populations is that random factors (factors unrelated to the cause of cancer or their control) are more likely to influence cancer incidence rates in smaller populations, where the numbers of cases are relatively small, than in larger populations. (Table 3)

<u>Discussion</u>

Cancer is a major cause of morbidity and mortality in Rhode Island, as it is in the United States as a whole. About four out of every 10 people in Rhode Island will develop cancer sometime in the course of their lives, and half of them will die of the disease. Close to four percent of the state's population (nearly 40,000 people) suffer from cancer at any one time.

Cancer is considered a public health problem because some cancers are preventable, and others controllable, through environmental or population-based interventions. For this reason, the United States (HP) and Rhode Island (Plan) both have established clearly articulated cancer control objectives for their populations.

Among the many different forms of cancer that beset humans, cancers of four anatomical sites clearly predominate in the United States: 1) cancer of the colon-rectum, 2) cancer of the lung, 3) cancer of the prostate (males), and 4) cancer of the breast (predominantly females). Of these four, the first two are largely preventable, and the last two are more easily controlled if identified as small tumors. For this reason, all four figure prominently in cancer control objectives, using population-based prevention and early detection strategies proven to be effective in research studies. (HP, Plan)

The relative effect of proven cancer control interventions from place to place may be examined by comparing cancer incidence rates computed from cancer registry data. Examining differentials in cancer incidence rates by municipality, for example, may be helpful in targeting local cancer control interventions. For example, municipalities with high lung cancer incidence rates might consider targeting the reduction of tobacco use, while those with high colorectal incidence rates might consider ways of increasing the proportion of eligible persons receiving endoscopic exams of the colon. On the other hand, municipalities with low prostate cancer incidence rates or low breast cancer incidence rates might consider ways of promoting screening tests for these cancers.

A caution that should be observed in comparing rates across geographic entities with small populations is that random factors (factors unrelated to the cause of cancer or their control) are more likely to influence cancer incidence rates in smaller populations, where the numbers of cases are relatively small, than in larger populations. Nonetheless, when interpreted judiciously, municipal cancer rates serve as a good introduction to more comprehensive thinking about the factors that cause and reduce the cancer burden (incidence, prevalence, and mortality) across geographic areas.

Cancer Mortality in Rhode Island Cities and Towns

In support of local cancer control task forces in Rhode Island, the Rhode Island Cancer Registry of the Rhode Island Department of Health (HEALTH) has constructed cancer mortality rates for 39 municipalities, using death reports made to HEALTH over the 14 years 1987-2000, and population data from the U.S. censuses of 1990 and 2000.

<u>Background</u>

In the period 1987-2000, Rhode Island's average annual, age-adjusted, gender-specific mortality rates for all malignant neoplasms (males: 284.3 per 100,000; females: 181.4 per 100,000) exceeded New England's rates (males: 273.2 per 100,000; females: 179.5 per 100,000), which in turn exceeded national rates (males: 268.0 per 100,000; females: 171.7 per 100,000). These differentials, observed for more than fifty years, have decreased over time, especially in the last 15 years of observation, and especially for women.

<u>Methods</u>

Counts of Rhode Island resident deaths from malignant neoplasms occurring between January 1, 1987, and December 31, 2000, categorized by age, gender, cause of death, and municipality were prepared from death reports made to HEALTH.

Counts of the Rhode Island population by age, gender, and municipality were obtained from publications of the 1990 and 2000 United States Censuses of Population. (Census) Analogous counts were estimated for the years 1991-1999 by linear interpolation, and for the years 1987-1989 by linear projection, using data from the two censuses.

Average annual, age-adjusted, gender-specific statewide and municipal cancer mortality rates were calculated from cancer death reports, actual and estimated counts of the Rhode Island population, and the year 2000 United States Standard Population. (CINA) The rates are expressed as "deaths per 100,000 population." Ninety-five percent confidence intervals were calculated for each municipal rate, and compared with the overall state rate, by gender. Statistically significant ($P < 0.05$) differences between state and municipal rates were noted.

Results

Table 14 -6. Statewide and municipal cancer mortality rates

Average annual sex-specific statewide and municipal cancer mortality rates, RI, 1987-2000.*

	------------- Males -------------				------------ Females ------------			
Municipality	Colon	Lung	Prostate	All**	Colon	Lung	Breast	All**
State	33.5	89.7	35.2	284.3	21.6	40.8	33.6	181.4
Cumberland	29.8	72.7	36.3	236.7	21.0	30.5	32.5	157.8
East Greenwich	24.2	55.6	24.6	197.3	17.1	24.5	29.7	137.3
East Providence	29.7	72.9	27.2	233.6	17.6	33.6	27.9	152.3
Exeter	10.9	79.1	30.7	189.3	8.7	48.7	24.8	148.7
Foster	17.1	63.7	27.9	147.8	6.9	45.2	20.9	124.4
Glocester	23.1	59.6	29.1	181.1	8.4	25.8	31.6	145.0
Hopkinton	27.0	61.6	17.1	181.0	15.1	26.3	12.9	110.1
Jamestown	19.3	33.4	37.2	189.3	23.3	27.4	35.9	155.7
Johnston	23.1	72.3	27.5	215.4	12.5	32.6	25.8	139.0

Table 14-10. Statewide and municipal cancer mortality rates with standard errors and 95% confidence limits by sex

Please refer to **Appendix: Supplemental Tables** (section 17) for data.

The statewide age-adjusted cancer mortality rate for all cancers combined is 284.3 per 100,000 among males and 181.4 per 100,000 among females. By municipality, rates among males vary from 197.3 per 100,000 for East Greenwich to 382.0 per 100,000 for New Shoreham, and rates among females vary from 136.6 per 100,000 for East Greenwich to 246.5 per 100,000 for New Shoreham.

Generally, Rhode Island's municipal-level cancer mortality rates have wide confidence limits, thus limiting their usefulness in identifying disparities at this level of geographical analysis. Among 78 possible gender-specific municipal-to-state comparisons, five are statistically significant at the $P < 0.05$, including:

1. lower-than-state rates for males residing in East Greenwich
2. lower-than-state rates for females residing in East Greenwich
3. lower-than-state rates for females residing in Bristol
4. higher-than-state rates for females residing in Warwick
5. higher-than-state rates for males residing in Woonsocket

Discussion

Cancer is a major cause of mortality in Rhode Island, as it is in the United States as a whole. Between two and three of every ten people in Rhode Island will die of the disease. Cancer death rates vary widely at the municipal level, but, with few exceptions, cannot be used to identify disparities among cities and towns because of statistical imprecision, as indicated by large standard errors and wide confidence limits. "Finer" analyses, of time trends or of rates for individual cancers, for example, would be even less productive of statistically significant differentials among municipal cancer mortality rates.

The five statistically significant differences found between two gender-specific state rates and 78 gender-specific municipal rates will be examined more closely, using data from various sources to try to explain higher or lower rates, recognizing that the differences may have been caused by random fluctuations in the distribution of cancer deaths throughout the state. (Note: 80 tests of statistical significance at the $P < 0.05$ probability level are expected to yield about four statistically significant results on the basis of chance, alone.)

In the meantime, we must work vigorously and consistently to apply basic cancer control strategies from Cancer Control Rhode Island: Strategic Plan for 1998-2005 (Plan) and from *Healthy People 2010* (HP):

- Prevent tobacco use; promote quitting among users.

- Screen eligibles for cancers of the cervix, breast, and colon-rectum.
- Identify people at high risk for cancers of the cervix, breast, ovary, prostate, colon-rectum, skin, and oral cavity; examine high-risk people regularly.
- Support American College of Surgeons approved hospital cancer programs.
- Assure state-of-the-art cancer care for all cancer patients; ascertain the eligibility of all cancer patients for clinical trials; promote enrollment in clinical trials.
- Promote the full use of hospice benefits for terminally ill cancer patients.